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For: COOLING APPARATUS USED FOR CRYONIC PRESERVATION, AND  
CORRESPONDING OPERATING METHOD

This listing of claims is for discussion purposes only with the examiner and is not provided for amendment into the record at this time:

**Listing of Claims:**

Claims 1-29 (Cancelled).

30. (Currently Amended) Cooling equipment comprising:
- a) a cooling agent storage container housing a cooling agent;
  - b) a cooling agent supply line connected to the cooling agent storage container for supplying the cooling agent to a cooling chamber, said cooling chamber being open on its bottom with regard to the overall force of gravity at said cooling equipment;
  - c) a heater with an adjustable first heating performance for heating the cooling agent supplied to the cooling chamber, the heater integrated in the cooling agent supply line;
  - d) an evaporator in the cooling agent storage container with an adjustable second heating performance for evaporating the cooling agent present in the cooling agent storage container;
  - e) a first temperature sensor for measuring a chamber temperature in the cooling chamber;
  - f) a second temperature sensor for measuring an agent temperature of the cooling agent supplied to the cooling chamber; and
  - g) a controller for temperature control, the controller having an input side and an output side, the input side connected to the first temperature sensor and the second temperature sensor, the output side connected to the heater and the evaporator, wherein the controller: (i) is adapted to detect several temperatures as control variables; (ii) is a multiple controller adjusting the first heating performance and the second heating performance as manipulated variables.

Claims 31-34 (Cancelled).

35. (Previously Presented) The cooling equipment according to Claim 30, wherein the temperature sensors are arranged in a spatially distributed manner for measuring a spatial distribution of temperature.

36. (Previously Presented) The cooling equipment according to Claim 30, wherein at

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least one of the temperature sensors is a thermocouple and at least one of the temperature sensors is a temperature-dependent electrical resistor.

37. (Cancelled).
38. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling agent is nitrogen.
39. (Previously Presented) The cooling equipment according to Claim 30, wherein the first temperature sensor and the second temperature sensor are connected to storage equipment that stores temperature courses.
40. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling agent supply line is adapted to empty via a diffuser into the cooling chamber.
41. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling agent supply line is adapted to empty laterally into the cooling chamber.
42. (Previously Presented) The cooling equipment according to Claim 41, wherein the cooling agent supply line is adapted to empty into the cooling chamber only on one side of the cooling chamber.
43. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling agent supply line is adapted to empty into the cooling chamber at a top of the cooling chamber.
44. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling chamber is closed.
45. (Cancelled).
46. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling chamber is portable.
47. (Previously Presented) The cooling equipment according to Claim 30, wherein the first temperature sensor is arranged inside the cooling chamber and spaced from a wall of the cooling chamber.
48. (Previously Presented) The cooling equipment according to Claim 47, wherein the first temperature sensor is fastened to the cooling chamber by a holding member extending into the cooling chamber.
49. (Previously Presented) The cooling equipment according to Claim 47, wherein the first temperature sensor is attached to one of a sample and a sample holder.
50. (Previously Presented) The cooling equipment according to Claim 30, wherein the

first temperature sensor is connected to a transponder that transmits a measured temperature in a wireless manner to the control device.

51. (Previously Presented) The cooling equipment according to Claim 50, wherein the transponder is selected from the group consisting of a radio transponder, an ultrasonic transponder, an optical transponder and an infrared transponder.

52. (Currently Amended) An operating method for cooling equipment, said method comprising the following steps:

- a) introducing a cooling agent into a cooling chamber for cooling cooled material, the cooling chamber being open on its bottom with regard to the overall force of gravity at the cooling equipment;
- b) heating the cooling agent prior to the introducing step with an adjustable first heating performance;
- c) measuring an agent temperature of the heated cooling agent;
- d) measuring of a chamber temperature in the cooling chamber; and
- e) controlling at least one of the agent temperature and the chamber temperature in that both temperatures are detected as control variables, including controlling the adjustment of a second heating performance as another manipulated variable in addition to controlling the adjustment of the first heating performance; and
- f) evaporating the liquid cooling agent in a cooling agent storage container with an evaporator having the adjustable second heating performance to provide an evaporated cooling agent as the cooling agent.

53. (Previously Presented) The operating method according to Claim 52, further comprising the following steps:

- g) heating the evaporated cooling agent prior to the introducing step with the adjustable first heating performance; and
- h) multiple controlling of the first heating performance and of the second heating performance.

54. (Previously Presented) The operating method according to Claim 52, further comprising the following steps:

- g) measuring of several spatially distributed temperatures inside the cooling chamber; and
- h) multiple controlling of the first heating performance and of the second heating performance as a function of the different temperatures inside the cooling chamber.

55. (Previously Presented) The operating method according to Claim 52, further comprising the following steps:

- g) measuring with a thermocouple the chamber temperature and the agent temperature prior to the introducing step;
- h) measuring with a temperature-dependent resistor the chamber temperature and the agent temperature prior to the introducing step; and
- i) multiple controlling of the first heating performance and of the second heating performance as a function of temperatures measured by the thermocouple and of temperatures measured by the temperature-dependent resistor.

56. (Previously Presented) The operating method according to Claim 52, further comprising the following steps:

- g) setting a target value in the cooling chamber,
- h) controlling the agent temperature of the cooling agent entering into the cooling chamber in accordance with the target value set for the cooling chamber by adjusting the first heating performance.

57. (Previously Presented) The operating method according to Claim 56, wherein the agent temperature of the cooling agent entering into the cooling chamber is controlled to the target value for the chamber temperature in the cooling chamber.

58. (Previously Presented) A method of cryopreserving a biological sample comprising cooling the biological sample in the cooling equipment according to Claim 30.

59. (Previously Presented) The cooling equipment according to Claim 30, wherein the cooling chamber is bell shaped.

60. (New) The cooling equipment according to Claim 30, wherein said cooling equipment is a non-recirculating cooling agent apparatus.

61. (New) The cooling equipment according to Claim 30, wherein said cooling chamber is open at its bottom for communication of the cooling agent to the atmosphere beyond the cooling equipment to reach and cool a sample.

62. (New) The operating method according to Claim 52, wherein said cooling equipment is a non-recirculating cooling agent apparatus.

63. (New) The operating method according to Claim 52, further comprising introducing the cooling agent to the atmosphere beyond the cooling equipment to reach and cool the cooled material.